



650 PASSENGER CAR COMPUTER WHEEL BALANCER

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CAUTION INFORMATION.



Wherever this symbol appears, there will be important instructions for your safe operation of the balancer.

CONGRATULATIONS!

YOU have purchased one of the most advanced and reliable electronic wheel balancers available on today's market. With reasonable care, your balancer will give you years of accurate, efficient and profitable service.

Please read this manual thoroughly, it contains the information necessary to assure safe and profitable operation. YOUR careful attention to these instructions will allow your balancer to be a more reliable and profitable asset in your business.

J.W. Bloodworth, Executive Vice-President, Sales and Marketing HENNESSY INDUSTRIES.

FEATURES

- * EXCLUSIVE DIRECT DRIVE SYSTEM, NO BELTS, NO PULLEYS, ONE MOVING PART.
- Will balance most automotive wheels.
- Backcone and Frontcone mounting system.
- Single spin dynamic two plane balance or static balance.
- Vertical wheel mounting.
- Fully interlocking guard hood (safety feature).
- Control panel:

Easy to read dials and position lights.

Electronics isolated from motor heat.

Positioned for best visibility.

Scratch resistant surface.

- * Static and Start (normal) operating modes.
- * Automatic rim gauge return,
- Simple calibration.
- * Removable shaft stud.
- * No bolt down installation.

SPECIFICATIONS

- Cycle time: 10 seconds for an average wheel.
- Maximum tire diameter: 35 inches.
- * Rim diameter: 10-17 inches.
- Rim width: 3-13 inches.
- * Balancing increments:

Start (normal) mode: 1/10 ounce. Fine balance mode: 1/10 ounce.

High Accuracy mode: 1/50 ounce.

* Accuracy:

Start (normal) mode: \pm 1/10 ounce (or \pm 3 grams). Linear to 8 ounces.

Modified torque motor with:

850 RPM rating.

Forced air cooling.

Large housing for heat dissipation.

Heavy duty insulation for high temperature application.

Shipping weight: 260 lbs.

POWER REQUIREMENTS:

STANDARD:OPTIONAL:110 VAC220 VAC20 AMPS20 AMPS50/60 Hz50/60 HzSingle PhaseSingle Phase

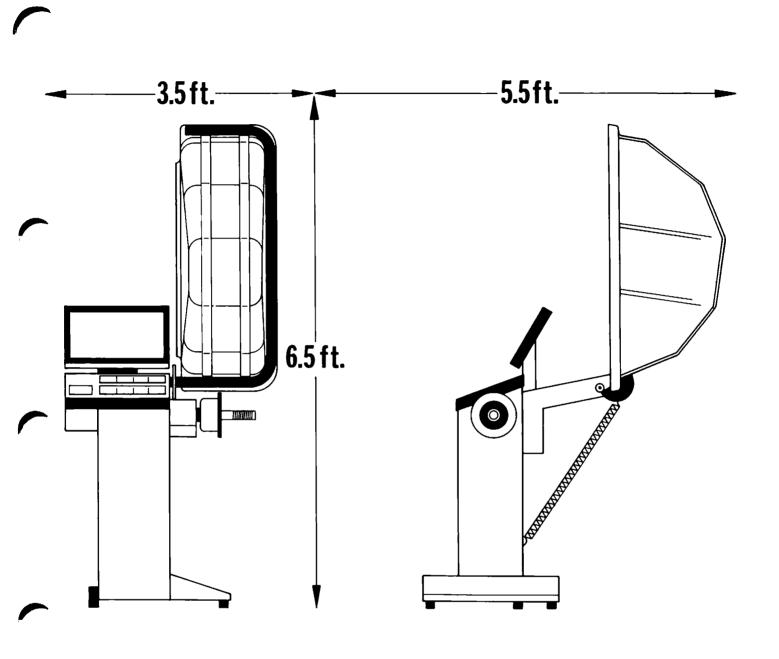
STANDARD PACKAGE AND ACCESSORIES:

Includes balancer with built-in 9 bin weight tray, interlocked guard hood, 4 back cones, threaded stud, back cone spring, hub nut, pressure drum, 3 accessory pegs, wheel weight tool, calipers, hood spring, owner's warranty registration card, authorized balancer service depot list, and hardware as described in assembly text.

OPTIONAL EQUIPMENT:

- * Combi adapter, for special wheels.
- * Light truck cone mounting system.

INSTALLATION



WORK SPACE: Space around balancer must allow access to control panel, accessory pegs, weight tray and wheel weight applications.

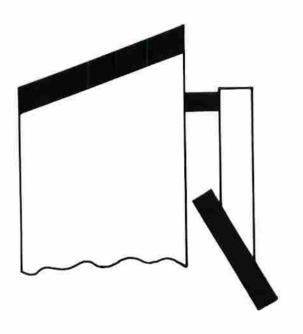
FLOOR REQUIREMENTS: Floor must be solid and flat, preferably of concrete. Balancer need not be bolted to floor in normal service. Balancer may be bolted to floor with anchor bolts through the three (3) support feet. If balancer is bolted down, alternate methods of electrical connections must be used (see Electrical Power).

NOTE: It is important that the balancer stand only on the three support feet.

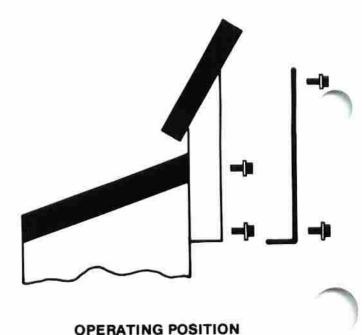
UNPACKING: Check carton and pallet for crushed corners, broken slats, gouges and punctures which may indicate hidden damage. Make a note of all external damage on the receiving waybill. Freight damage is the responsibility of the delivering carrier. Remove outer carton from pallet. Remove bolt holding hood in shipping position. Locate and remove all accessories. Notify manufacturers representative of any missing accessories that were ordered.

CONTROL POD ASSEMBLY INSTALLATION: Carefully hold Control Pod assembly while removing the two (2) shipping bolts, spacers and felt washers. (Note: do not over stress the cable harness). Carefully locate the control unit in its operating position and install four (4) $\frac{1}{4}$ -20 x $\frac{3}{4}$ " self-threading washer head bolts – do not over tighten. Bolt on the rear cover (1) with four (4) of the same aforementioned bolts.



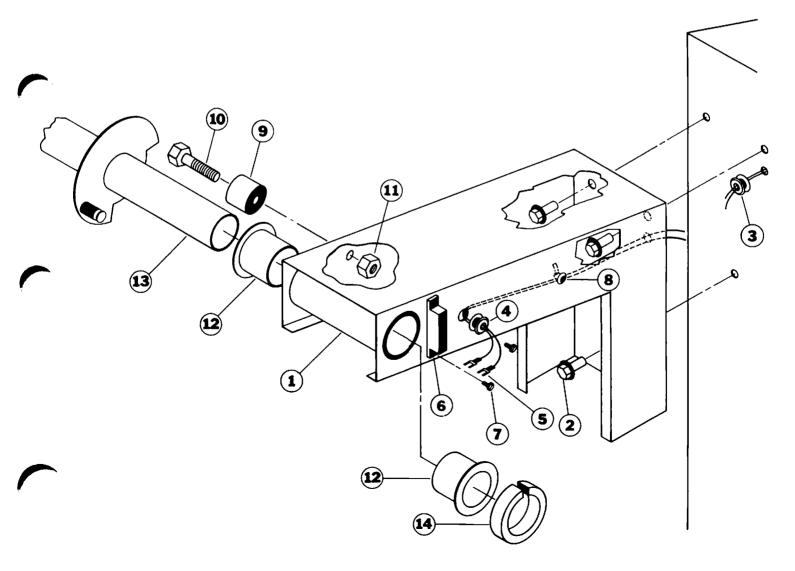


SHIPPING POSITION

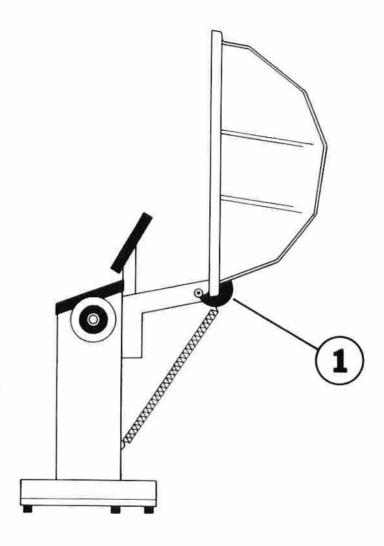


HOOD BRACKET AND HOOD INSTALLATION:

- 1. Remove hood bracket (1) from pallet.
- 2. Feed hood switch wires (5) through 1/2" diameter hole in back of hood bracket.
- 3. Bolt on hood bracket with the three (3) %-16 x 1" washer head bolts (2).
- 4. Feed wires through wide rubber grommet (3) and press grommet into place.
- 5. Press narrow rubber grommet (4) into ½" diameter hole in side of hood bracket. Feed wires (5 through grommet.
- 6. Install hood switch (6) using two (2) #6-32 x %" self threading screws (7) do not over tighter Wire terminal screws must be towards balancer. Connect wires (5) to terminal screws (wire can be connected either way).
- 7. Install tie wrap push mount (8) into ¼" diameter hole in side of hood bracket. Feed supplied ti wrap through push mount and around hood switch wires, tighten and trim.
- 8. Install hood stop (9) on side of hood bracket using the ½-13 x 1¾" hex bolt (10) and ½-13 nylo nut (11).
- 9. Slide two (2) white plastic bearings (12) into the hood bracket. Slide hood/hood bar assembl (13) through plastic bearings (12).
- 10. Install magnetic stop ring (14) with hood in the down position. Magnet in stop ring should be next to hood switch and the slot in the stop ring at the 12 o'clock position.
- 11. Loosen hood switch screws (7) and move hood switch (6) sideways until there is a gap o approximately 1/16" between the magnetic stop ring (14) and the hood switch. Tighten hooc switch screws.



REMOVING BALANCER FROM SHIPPING PALLET: Tightly install the three (3) accessory pegs into the left side of the balancer. Remove the three (3) ½-13 hex nuts from the shipping bolts holding the balancer to the pallet. Gently tap the shipping bolts down towards the floor. Grasp the balancer by the accessory pegs and hood bracket and carefully lift the balancer off the pallet and move to final location. Install and tighten the threaded stud into end of motor shaft. Balancer will not operate properly on pallet.



HOOD SPRING INSTALLATION: Locate "hook-end" of spring in %" diameter hole in the back of the balancer. Hold hood in the up position and carefully place eye of spring into groove of pin on hood bar cam (1).



ASSISTANCE FROM ANOTHER PERSON IS ADVISABLE WHEN MOVING BALANCER AND INSTALLING HOOD SPRING.

ELECTRICAL POWER

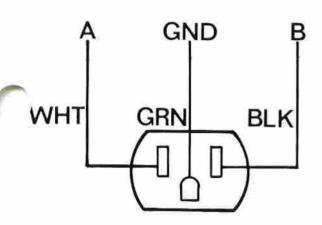
Consult a licensed electrical contractor for proper installation to local electrical codes. Power outlets must be enclosed in a floor raceway or overhead drop if pedestrians or equipment traffic can damage power cord.

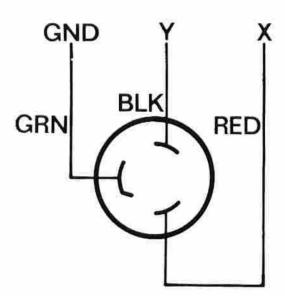


Operation with a defective ground circuit will create a shock hazard for the operator and could damage the balancer's electronics. Operation with a defective ground circuit may void warranty.

PRECAUTIONS

Check voltage requirements on balancer ID plate. Balancer requires nominal 115 VAC, 60 Hz, single phase power with a 20 ampere fuse or circuit breaker and a three pin safety outlet wired as shown below. Alternately, the machine can be supplied for 220 VAC, 60 Hz, single phase operation using Hubbel #2321. Mating outlets would be Hubbel #2310 or Bryant #70520FR. Electrical outlets must have a solid connection (less than 1 ohm between ground pin and building ground).





TYPE: PHASE: NOMINAL VOLTAGE: VOLTAGE READINGS BETWEEN: Standard Single 115 VAC Optional Single 220 VAC

X-Y

200-250 V

A-B 115 V

Power and ground requirements must be verified by installer or inspector before connecting balancer. Failure to observe this precaution may void warranty.

If balancer is bolted down a licensed electrical contractor must be consulted. Most electrical codes require "hard" wiring when balancer is bolted down.

INITIAL TESTING

Initial testing and training are provided by the Manufacturers Representative. Complete instructions for unpacking and installing your balancer are contained in the INSTALLATION section of this manual.

PRECAUTIONS: Initial testing should be performed by the instructor. Power requirements must be verified by the installer or instructor before connecting balancer. Failure to observe this precaution may void warranty.

POWER: Plug power cable into power outlet receptacle. Set circuit breaker in building breaker panel on. Set On/Off switch on. Leave power on during an entire work day.

COOLING AIR: Check to verify cooling air blower is running. Do not operate unit unless cooling air flow is present.

SPIN: Lower guard hood and press start-button. Faceplate should rotate clockwise when looking towards end of motor shaft.

Note: If the above conditions cannot be obtained during initial test, call the distributor for service advice.



DO NOT induce vibrations into balancer while in operation as this causes inaccurate weight readings, i.e., do not kick or tap on balancer.

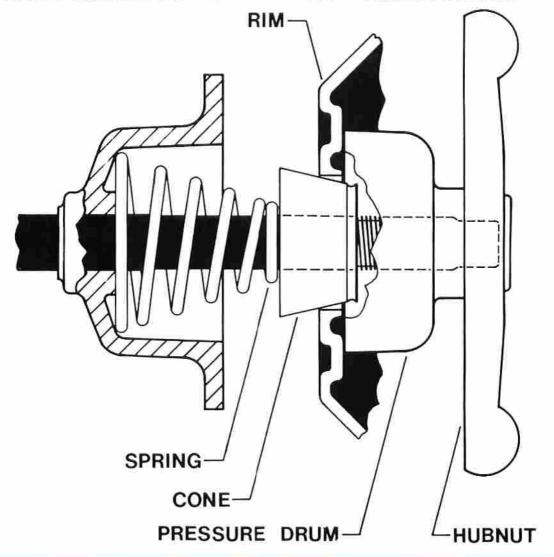
MOUNT WHEEL: Choose the correct mounting method.

- Back cone mounting: Almost all wheels, including aftermarket or "mag" wheels, can be mounted using one of the four correct size cones. (See page 10).
- Front cone mounting: Any correct size cone can be used (See page 11).
- III. Combi adapter: Optional accessory (see pages 12 & 13).
 Can be used for mounting 3, 4, 5, 6, 8, or 10 lug wheels and wheels that center off the lug pattern, i.e., 1968 or older VW, Peugeot, etc.
- IV. Light truck cone: Optional accessory (see page 14). Used for mounting light truck wheels.



I. BACK CONE MOUNTING:

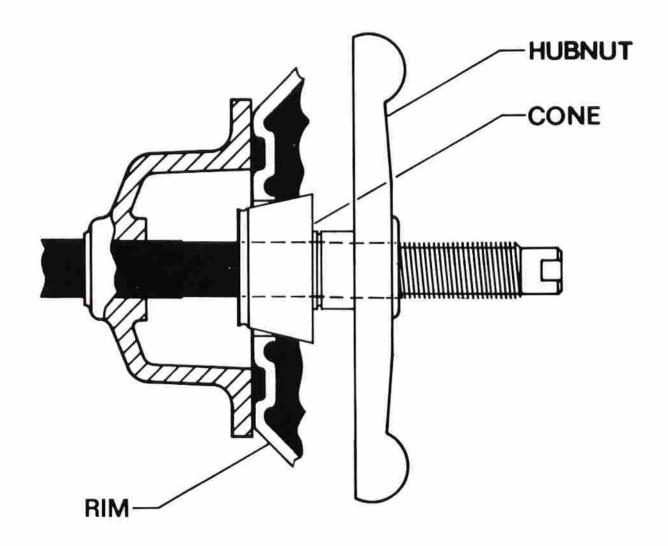
- Place spring over threaded stud with the large end inside of the faceplate. Spring must be used.
- 2. Select a cone that best fits into wheel center hole.
- 3. Slide selected cone onto threaded shaft with the large end against the spring.
- 4. Lift wheel onto shaft and center on cone.
- For most wheels the pressure cup should be snapped on to the hubnut. A nylon spacer (no mar ring) can also be used to protect custom wheel finishes.
- Thread hubnut on and tighten by hand. If hubnut won't tighten all the way down, use the front cone mounting system. The wheel must be forced firmly against the faceplate.





II. FRONT CONE MOUNTING:

- 1. Select a cone that best fits into wheel center hole.
- 2. Lift wheel onto threaded shaft.
- 3. Slide selected cone onto shaft with the small end against the wheel.
- 4. By lifting wheel from bottom, center on cone.
- Thread hubnut on and tighten by hand. If hubnut won't tighten all the way down because of a lack of threads, use an additional cone to act as a spacer between the hubnut and existing cone. The wheel must be forced firmly against the faceplate.





III. OPTIONAL COMBI ADAPTER

The Combi Adapter can be used for 3, 4, 5, 6, 8 or 10 lug wheels by installing the appropriate number of swivel plates in the adapter plate hole pattern.

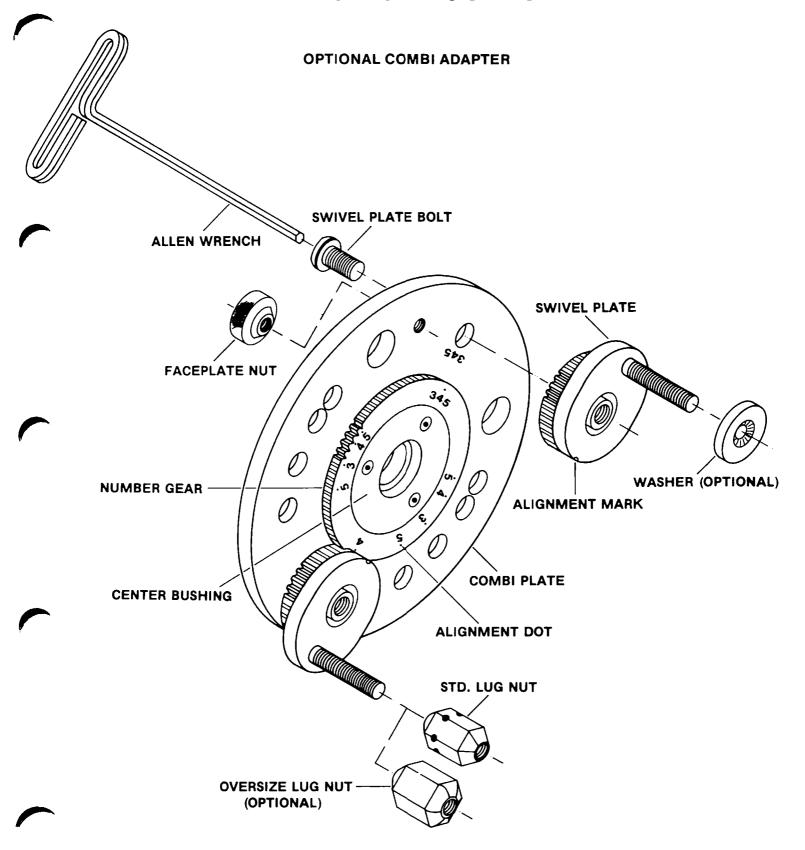
Assemble the adapter as follows:

- Install a swivel plate over the adapter plate hole marked 3, 4, or 5 depending on the number required. Align the index notch on swivel plate center line with the appropriate 3, 4 or 5 mark on the large gear. Insert shoulder bolt through back of adapter and tighten using 3/16 hex key.
- Install the appropriate number of swivel plates being careful to align index notches. Do not tighten shoulder bolts. After all swivel plates have been installed, loosen the shoulder bolt on first swivel plate.
- Install adapter on wheel by turning swivel plates until correct bolt circle diameter is found. Install lug nuts and tighten with adapter wrench using a crossing (star) pattern.
- 4. Tighten shoulder bolts securely from the back of adapter using 3/16 hex key.
- Mount adapter and wheel on the faceplate using the retaining nuts. Hand tighten the retaining nuts while rotating wheel to ensure centering.
- Wheel is now ready for balancing. Combi adapter may be left on faceplate if additional wheels with the same bolt pattern are to be balanced.

NOTE: The threaded stud may be removed for wheels without center holes.



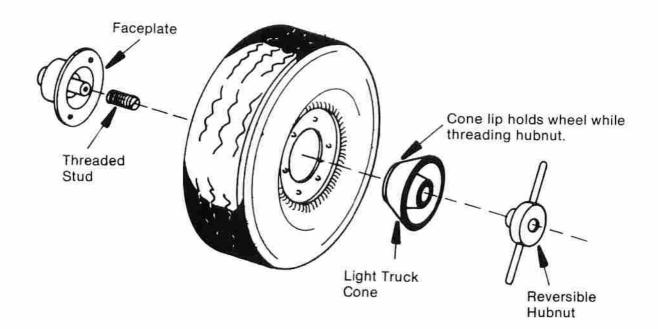
Lug nuts must be centered and threaded at least four full turns. Reverse lug nuts as required. Use only adapter wrench furnished with adapter. Do not use air tools or impact wrenches.



LIGHT TRUCK CONE.



Cone must be centered in wheel center hole before tightening. Thread hubnut on and tighten by rotating wheel and striking both arms of hubnut with palm of hand.





DISPLAY BOARD LAYOUT

- 1. INNER WEIGHT DISPLAY.
- 2. INNER POSITION DISPLAY.
 - 3. WHEEL OFFSET (A) KNOB.
 - 4. WHEEL WIDTH (W) KNOB.
- 8. STATIC BALANCE BUTTON.

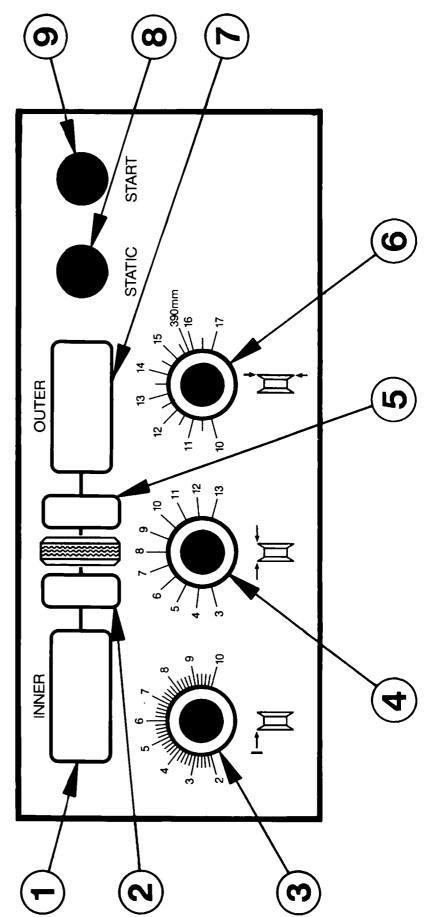
7. OUTER WEIGHT DISPLAY.

WHEEL DIAMETER (D) KNOB.

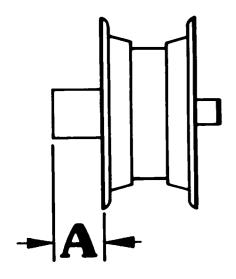
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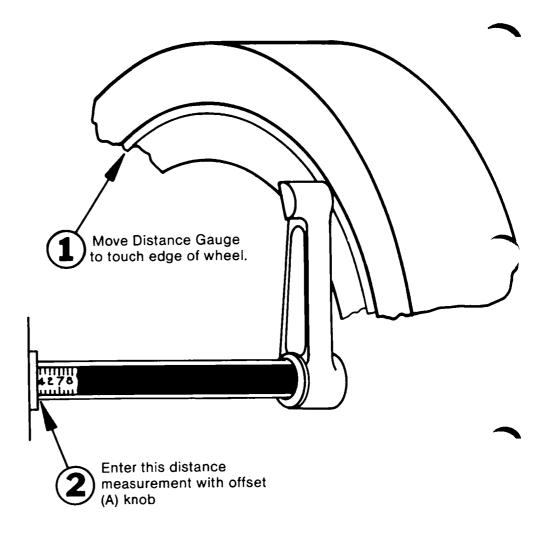
5. OUTER POSITION DISPLAY.

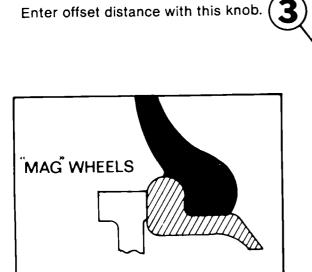
9. START (NORMAL) BALANCE BUTTON

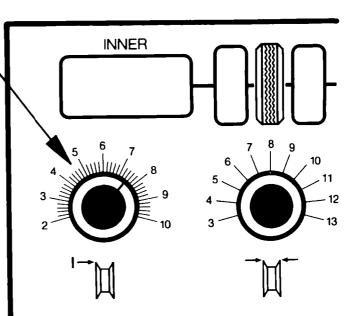


2. OFFSET

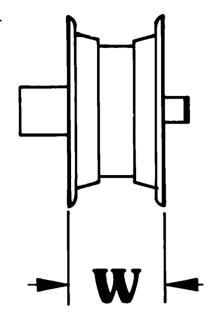




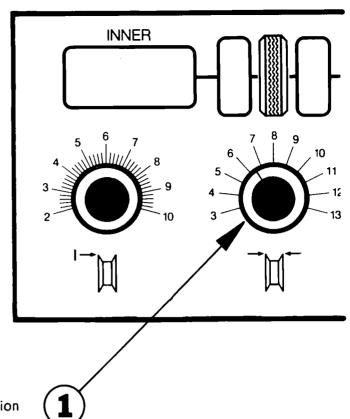


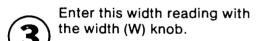


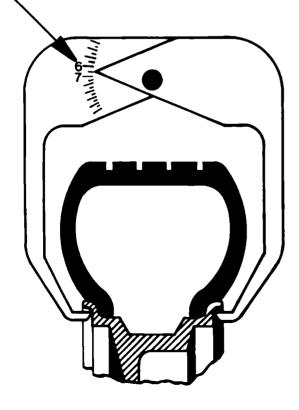


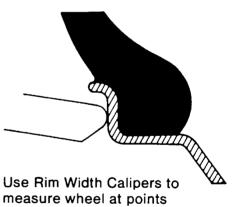


Enter Wheel Width information with this knob.

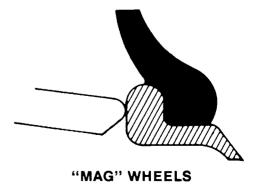




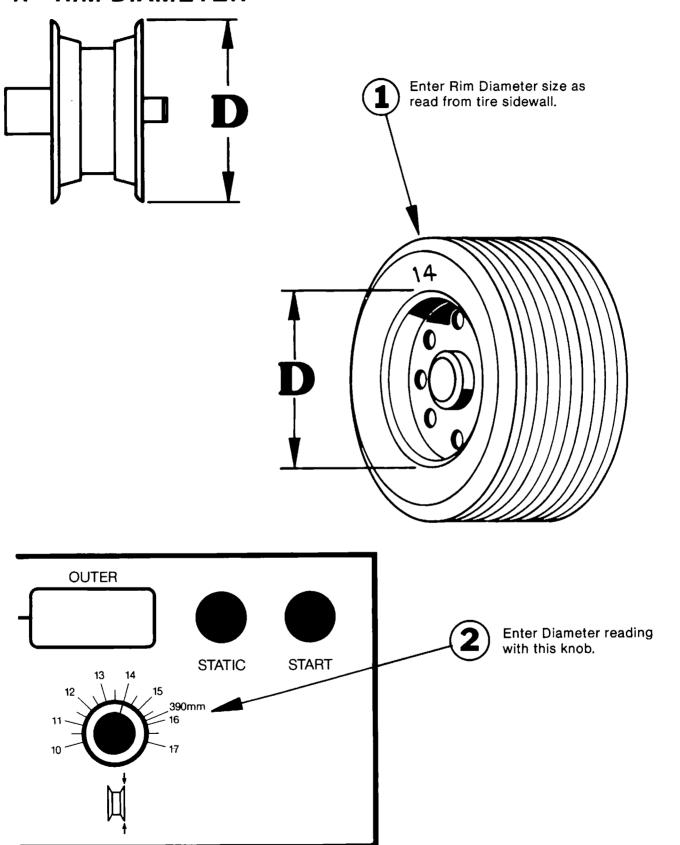




measure wheel at points shown.



4. RIM DIAMETER



SPIN MODE



Lower Guard Hood Before Starting Spin.

 Press START button to obtain normal readings. For fine balance, hold selected button down during spin cycle. Balancer will spin and stop automatically.

BALANCING INCREMENTS:

NORMAL

FINE

HI-ACC (Page 26)

1/4 ounce

1/10 ounce

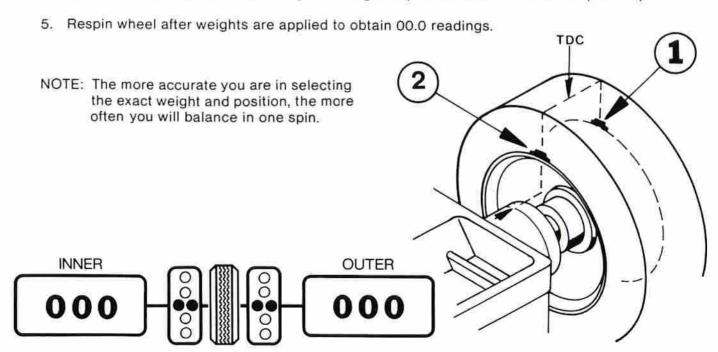
1/50 ounce

6. TAKE READINGS

1. Weight and position readings will appear on displays as balancer is braking tire.

7. ATTACH WEIGHT

- 1. Rotate wheel until right (outer) red position lights begin flashing.
- 2. Attach weight equal to outer weight reading at top dead center of outer rim (see #1).
- Rotate wheel until left (inner) red position lights begin flashing.
- 4. Attach a weight equal to inner weight reading at top dead center of inner rim (see #2).



BALANCING SPECIAL MAG WHEELS.

(ADHESIVE WEIGHTS)

If standard clip weights are to be used, balance as a "standard" wheel. If adhesive weights must be used, follow these instructions.

- 1. See examples 1, 2 and 3 to select how weights will be applied.
- Set distance gauge, wheel width and wheel diameter as indicated in the proper example.
- 3. Lower hood and push the START button.
- 4. Read weight amount and locate position as with a "standard" wheel.
- 5. Raise hood. Apply required weights.
- 6. Lower hood. Push START button and check weight application.

NOTE: Since hiding adhesive weights involves approximations to actual wheel manufacturer's width and wheel diameter, additional spins may be required. Simply respin and apply weights as called for.

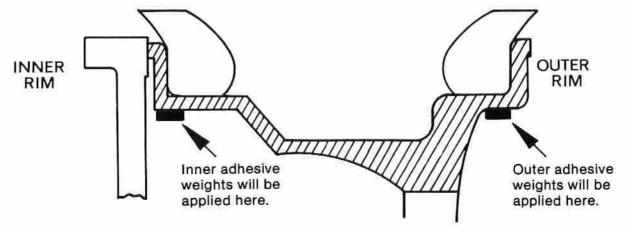


WARNING: Be sure wheel surfaces are clean as per adhesive weight manufacturer's recommendations. Apply weight securely, failure to do so may cause weights to come loose resulting in serious personal injury.

I. TWO ADHESIVE WEIGHTS

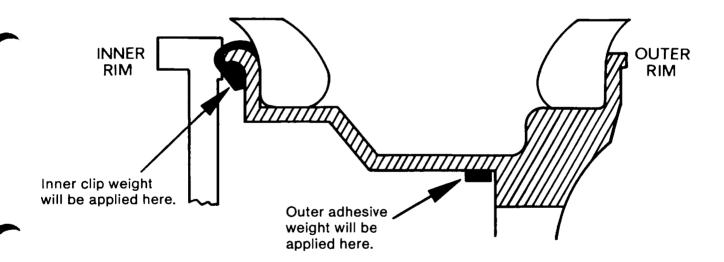
(Outside weight visible)

- 1. Move distance gauge arm to touch inner edge of wheel. Enter offset reading (A).
- 2. Measure rim width (W) with rim width calipers and enter measurement.
- 3. Enter a wheel diameter (D) 11/2 sizes smaller than actual wheel size.
- 4. Lower hood and press START button to obtain readings. Raise hood.
- 5. Read inner weight amount. Locate position for inner plane. Apply adhesive weight.
- 6. Read outer weight amount. Locate position for outer plane. Apply adhesive weight.



II. STANDARD CLIP WEIGHT AND ONE ADHESIVE WEIGHT.

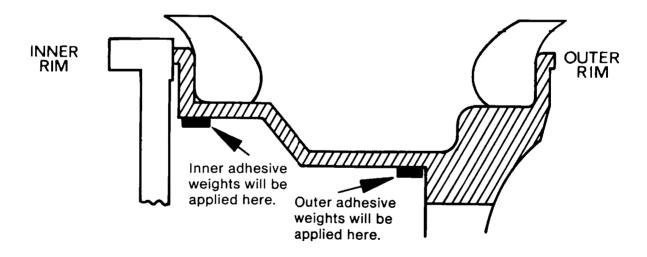
- 1. Move distance gauge arm to touch inner edge of wheel. Enter offset reading (A).
- 2. Measure width between inner rim and location where hidden weight will be applied. Enter this for rim width measurement (W).
- 3. Enter a wheel diameter (D) 11/2 sizes smaller than actual wheel size.
- 4. Lower hood and press START button to obtain readings. Raise hood.
- 5. Read inner weight amount. Locate position for inner plane. Attach standard clip weight.
- 6. Read outer weight amount. Locate position for outer plane. Apply adhesive weight.
- 7. Lower hood. Push START button and check weight application.



III. TWO ADHESIVE WEIGHTS.

(Hidden method)

- 1. Move distance gauge arm to touch inner edge of wheel. Enter offset reading (A).
- 2. Measure width between the locations where the inner and outer weights will be applied. Enter for rim width measurement (W).
- 3. Enter a wheel diameter (D) 11/2 sizes smaller than actual wheel size.
- 4. Lower hood and press START button to obtain readings. Raise hood.
- 5. Read inner weight amount. Locate position for inner plane. Attach standard clip weight.
- 6. Read outer weight amount. Locate position for outer plane. Apply adhesive weight.
- 7. Lower hood. Push START button and check weight application.

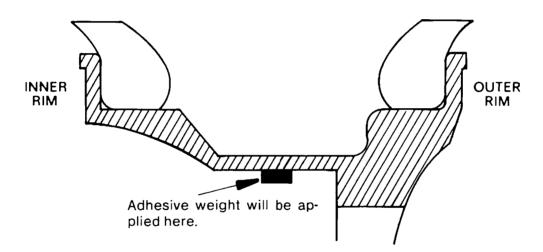


STATIC BALANCING.

(Adhesive weight)

NOTE: This method is equivalent to a bubble balance which is an inferior method. Static balancing should only be used when the customer requests no visible weights (on the outer plane) and there is a caliper clearance problem on the inner plane.

- 1. Since rim diameter is slightly smaller than tire size (D), enter a reading 1½ inches smaller than the actual tire size.
- 2. Press STATIC button. Read inner weight amount and locate position for static imbalance. Then install weight as described above.



SPECIAL PROBLEMS.

Customers will occasionally complain of vibration on the car after balancing. Some possible causes are listed below:

- 1. Beads improperly seated. Check bead seating and inflation pressure before balancing spin.
- 2. Stiffness variations in radial belts.
- 3. Tire out of round; wheel out of round, bent, or not running true. Visually check runout of wheel and tire during balance spin. Re-check mounting. Replace wheel or tire is necessary.
- 4. Suspension wear, misalignment, or loose vehicle components.
- 5. Wheels not correctly centered due to damaged hub, damaged or worn center hole, worn bolt circle holes, or imprecise original design. Check wheel run out before balance spin and on the vehicle after mounting.
- 6. Sensitive suspensions. Use FINE BALANCE (See page 19).

COMPLAINT:	REMEDY:
Balancer uses too many weights or several spins to balance.	Recheck rim dimensions entered. Position the weights exactly top dead center when red position lights are flashing.
Weight or position readings fluctuate.	Check cone/hubnut for slippage. Check the balancer is resting firmly on three mounting points, floor is flat and stable, and that no tools or weights are between balancer and floor.

CALIBRATION CHECK PROCEDURE

The calibration check procedure can be performed by the operator to ensure that the balancer is operating correctly and is properly calibrated. The only purpose of calibration is to fine tune the balancer to yield single-spin balancing.

NOTE: If the balancer is set up to display weights in grams instead of ounces, then observe the parenthesis "(XXX grams)" values in the calibration check and calibration adjustment procedures.

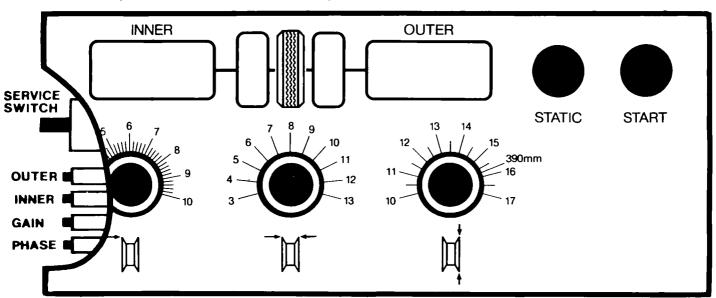
Throughout the calibration check procedure keep the START button depressed during each cycle. This is the "fine balance" mode which allows balancer to read in 0.10 ounce (1 gram) increments.

- 1. Mount a standard domestic 14.0 x 6.5 wheel with a standard tire using the proper wheel mounting method. Ensure that the wheel is not bent or misaligned and that the center hole is free from nicks and burrs.
- 2. Program the offset, rim width and rim diameter information into the balancer by setting the knobs on the display panel.
- 3. Balance the wheel using the fine balance until 0.00 weight readings appear on the inner and outer displays while holding down the START button during the entire cycle.
- 4. Install a 4 ounce (113 grams) test weight on the outer rim.
- 5. Spin. The new weight reading should by 3.90 to 4.10 ounces (110 to 116 grams). Rotate the wheel so that the center position lights on the outer position indicator flash on. The test weight should be directly across (at 6 o'clock). Weight readings on the inner display should be 0.30 ounces (8 grams) or less (This results from interference between the two balancing planes).
- 6. Repeat steps 4 and 5 with the 4 ounce (113 grams) test weight on the inner rim.
- 7. If the balancer fails to yield the proper results required by the procedure, perform the Calibration Adjustment Procedure on page 26.

CALIBRATION ADJUSTMENT PROCEDURE

NOTE: Do not calibrate when motor is excessively hot.

- Remove the six (6) screws holding the Display Board Bezel and lift the bezel off. Access to center bottom screw is obtained by removing the hole plug in the rear cover of the control pod assembly.
- 2. Perform the Calibration Check Procedure steps 1 thru 3 (See page 25).
- 3. Enter the High Accuracy Mode by pressing the START button three times quickly in succession. Hold it in the third time until the display flashes "HI-ACC". This shows that the High Accuracy Mode is now operative.
- 4. Place a 4 ounce (113 grams) test weight on the outer rim.
- 5. Set service switch to upper position (Test mode). Press the START button. The display will now read "TEST". The outer and inner position lights will now act as a bar graph. First adjust the gain trimpot until the minimum number of lights are on or flashing. Alternately adjust the gain and phase trimpots until all the lights are off.
- 6. Set service switch to bottom position (Norm). Remove the test weight and balance wheel. A maximum imbalance of 0.04 ounces (1 gram) is allowed on both the inner and outer weight displays.
- 7. Repeat steps 4 and 5.
- 8. Set service switch to center position (Non-stop). Press the START button. Wheel will come up to speed, but not go into the braking mode. Now adjust the outer weight trimpot (affects outer magnitude). After each adjustment of the trimpot, press and hold in the START button until a new reading appears on the display. Continue this procedure until the outer weight display reads 4 ounces (113 grams). The inner weight reading should be 0.10 ounces (2 grams) or less. Set the service switch to the bottom position so that the wheel will brake to a stop.
- Place the 4 ounce (113 grams) test weight on the inner rim. Set service switch to center position. Press the START button.
- 10. Adjust the inner weight trimpot (affects inner magnitude) until display reads 4 ounces (113 grams). Use the same procedure as in step 8. The outer weight reading should be 0.10 ounces (2 grams) or less. Set the service switch to the bottom position. (norm).
- 11. Calibration is now complete. To return the balancer to the normal operating mode: Switch off the power and then turn it on again (On/Off switch located on rear of machine). This clears the High Accuracy mode and the balancer is ready to use.



PREVENTIVE MAINTENANCE



DO NOT use a solvent which leaves an oil residue.



NEVER use compressed air or a water hose to clean any part of your balancer.

DAILY:

Clean shaft and faceplate with a vaporizing solvent. Cones, hubnut and other

mounting hardware should by checked/cleaned at this time.

MONTHLY:

Clean entire machine. Remove all used weights, tools and parts which may be

under, or leaning against the balancer. Perform calibration check procedure.

Make adjustments only if required.

NOTE:

Before each balancing operation make sure that the back face of the wheel is

clean - use a wire brush if necessary.